CLAIMS

New claims:

22. A fuel injection valve, comprising a fuel inlet; an excitable actuating device; a valve closing member movable by said excitable actuating device; a valve seat element with a fixed seat with which said valve closing member cooperates to open and close the valve; at least one outlet opening as a fuel outlet provided downstream of said valve seat, said at least one outlet opening on its ejection end having an outlet region with a parameter which deviates from a remaining part of said outlet opening and selected from the group consisting of a shape, a size, and a contour, and is recessed from a side of said outlet opening remote from said valve seat and also is contoured independently from said remaining part of said outlet opening; and a swirl-generating means located upstream of said at least one outlet opening and associated with said at least one outlet opening.

23. A fuel injection valve as defined in claim 22, wherein said at least one outlet opening is provided precisely upstream of said valve seat, so that an opening of said swirl generating means is associated with said at least one outlet opening upstream.

24. A fuel injection valve as defined in claim 22, wherein said at least one outlet opening is provided in said valve seat element.

25. A fuel injection valve as defined in claim 22; and further comprising an ejection region provided downstream of said valve seat element, said at least one outlet opening being arranged in said ejection region.

26. A fuel injection valve as defined in claim 22, wherein said outlet region of said outlet opening is polygonal.

27. A fuel injection valve as defined in claim 22, wherein said outlet region of said outlet opening has a shape selected from the group consisting of a widening shape and a tapering shape in form of a truncated pyramid in a flow direction.

28. A fuel injection valve as defined in claim 22, wherein said outlet region of said outlet opening has a cross-section selected from the group consisting of a circular cross-section and an elliptical cross-section.

29. A fuel injection valve as defined in claim 22, wherein said outlet region of said outlet opening has a shape selected from the group consisting of a widening shape or a tapering shape frusticonically in a flow direction.

30. A fuel injection valve as defined in claim 22, wherein said outlet region of said outlet opening is curved in a form selected from the group consisting of a convex form and a concave form.

31. A fuel injection valve as defined in claim 22, wherein said outlet region of said outlet opening has a plurality of portions in succession in a flow direction, which differs from one another by a parameter selected from the group consisting of a shape, a size, and a contour.

32. A method of producing outlet openings in a fuel injection valve having a fuel inlet, an excitable actuating device, a valve closing member movable by the excitable actuating device, a valve seat element having a fixed valve seat with which the valve closing member cooperates for opening and closing the valve, at least one outlet opening as a fuel outlet provide a downstream of the valve seat, and a swirl-generating means located upstream of the at least one outlet opening and associated with the

at least one outlet opening, the method comprising the steps of producing a throughhole in a first method step; and creating in a second method step from an ejection end of the throughhole an outlet region so that it is varied with a parameter selected from the group consisting of a shape, a size, and a contour, compared to the throughhole.

33. A method as defined in claim 32; and further comprising recessing the throughole by a process selected from the group consisting of a stamping, an erosion and a laser beam boring.

34. A method as defined in claim 32; and further comprising recessing the outlet region by a non-metal-cutting production process.

34. A fuel injection valve as defined in claim 32; and further comprising recessing the outlet region with a highly focused, high-energy radiation of beams selected from the group consisting of electron beams and laser beams.

35. A fuel injection valve as defined in claim 32; and further comprising recessing the outlet region by a mold wire erosion.

36. A method as defined in claim 32, wherein said creating the throughhole in the first metal step includes creating the throughhole with a cross-section selected from the group consisting of a circular cross-section and an elliptical cross-section.

37. A method for producing outlet openings in a fuel injection valve having a fuel inlet, an excitable actuating device, a valve closing member movable by the excitable actuating device, a valve closing member cooperating with the valve seat for opening and closing the valve, at least one outlet opening as a fuel outlet provided downstream of the valve seat, a swirl-generating means upstream of the at least one outlet opening, a swirl-generating means associated with the outlet opening, the method comprising the steps of creating in a first method step a blind bore from an inlet side and opposite to an injection end; and creating in a second method step from the injection end of the outlet opening an outlet region up to the blind bore, far enough to create a continuous outlet opening.

38. A method as defined in claim 37; and further comprising recessing the blind bore by a process selected from the group consisting of an erosion and a laser beam boring.

39. A fuel injection valve as defined in claim 37; and further comprising recessing the outlet region by a non-metal-cutting production process.

40. A fuel injection valve as defined in claim 37; and further comprising recessing the outlet region by a highly focused, high-energy radiation, with beams selected from the group consisting of electron beams and laser beams.

41. A fuel injection valve as defined in claim 37; and further comprising recessing the outlet region by a mold wire erosion.